TB MIDI STUFF V2.1

IPAD USER GUIDE

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Presentation

TB MIDI Stuff (called later TBMS) is a generic modular MIDI control surface. It provides you the possibility to create your own page controller to drive your MIDI/OSC equipment. It also provides three built-in pages : a keyboard with arpeggiator, a pads controller and a 16 channels MIDI mixer.

TBMS use CoreMIDI so all compatible devices work with the application, even virtual MIDI ports to drive another app on the same device (TB MIDI Stuff provides four virtual MIDI Out ports).

TBMS Stuff can use accelerometer to calculate hit velocity on the iPad. You can also use the accelerometer and the gyroscope (with compatible devices) with all controls.

Whereas the current owner page is active, you can quickly show and use the built-in keyboard, the built-in pads controller and the built-in MIDI mixer, or swipe to the left/right/top/bottom page with a three fingers gesture.

TBMS manages Control Change messages (single and coarse/fine, unsigned and signed), RPN/NRPR messages (7 and 14 bits, unsigned and signed), Channel Pressure messages, Pitch Bend messages, Program Change messages, System Message messages, Song Select messages, Note On/Off messages, System Exclusive messages (with checksums, unsigned and signed).

TBMS can do **bidirectional MIDI, even with SysEx messages**. You can control this feature by MIDI message («Send Only», «Receive Only» or «Send and Receive»).

TBMS can also do **bidirectional OSC**.

IMPORTANT NOTE : TB MIDI Stuff is not a sound generator and doesn't produce any sounds

For any questions about TB MIDI Stuff : contact@tbstuff.com

Website : http://www.tbstuff.com/

Forums : http://www.tbstuff.com/forums/

Twitter : http://twitter.com/TBStuffCompany

Facebook : http:// www.facebook.com/pages/TBStuff/262769697081433

YouTube : https://www.youtube.com/TBStuffCompany

TB MIDI Stuff Cookbook : http://www.tbstuff.com/?page_id=978

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Credits

TBStuff want to thank their tester team : Fabrizio (the first of them), Steve, Vitor, Olivier, Boele, Dick, Ivan, Jim, Marc, Mark, Marlow, Mat, Max, Timothy, David, and last but not least, Dok & Pyer.

TBStuff also thank Hans, Minh and all the crew of Jabrudian Industries LLC, MatrixSynth, all members of VGuitar forums and all TBStuff Forums members and customers who help us to do a better app.

A special thank to Jean-Claude Dubois and Pierre Collard.

Legals

Arturia Mini V Editor was designed by Pyer © 2013 for TBStuff (http://www.pierrecollard.com)

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The Missing Link™ is a trademark of Jabrudian Industries LLC (http://wifimidi.com)

MIDI Interfaces Considerations

IMPORTANT NOTE : MIDI interfaces for iOS don't provide all the same MIDI implementation : some handles SysEx messages, some only in one way, some doesn't. Please check if your MIDI interface supports or not this kind of message before use them.

Note : for Missing Link™ users, see Missing Link™ Set Up section to know more about how it handles SysEx messages.

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What's New ?

v2.1.0

- **Custom Look Knobs & Sliders**
- **Custom Look Drum Pads**
- **Custom Look Piano Keys and Piano Keyboards**
- **Custom Look Jog Wheels**
- **Led Controls (Circular, Rectangular and Custom Look)**
- **Meter Controls (Horizontal, Vertical and Custom look)**
- **Image Controls**
- **Tooltips Wizards**
- **Internal Methods call**
- **Default Value on Pick Lists**
- **Panel variable on each page**
- **Pick List Fine Mode :**

  Double tap on every pick list to open a popover to set the value (+/- 1 and Jog Wheel) without showing the full popover.

WiFi MIDI Setup

IMPORTANT NOTE : The iOS WiFi MIDI driver can be used with TBMS but some considerations must be take in account about its using.

As WiFi use standard network protocols, which is not «real time» protocols, you could have an unpredictable latency when using it. This phenomena is smallest with an ad-hoc network but never goes to zero millisecond. So, we encourage you to use TB MIDI Stuff with a compatible sound card via the camera connection kit or with a device like IK Multimedia iRig MIDI, Line6 MIDI Mobilizer II, etc..

WiFi Setup on a Mac

Go to your utilities folder and launch "audio midi setup"

If you don't see the "midi studio" window, select "show midi window" in the top menu bar.

Now double click the network icon.

Add a new session by clicking the plus sign and activate it by clicking the checkbox.

Make sure you set the option "who may connect to me" to either "anyone" or "only computers in my directory".

Now start the TB MIDI Stuff app on the iPad.

Your iPad's name will now appear in the Directory.

Click your iPad's name then click the connect button.

Your iPad's name will now appear in the Participants section.

You can now close the midi setup windows.

Open the global settings on TB MIDI Stuff app (the wrench icon on the toolbar) and select the created session for “MIDI In” and “MIDI Out”.

WiFi Setup on a PC

Install the rtpMIDI driver. (http://www.tobias-erichsen.de/rtpMIDI.html)

You will be directed to install Bonjour for Windows if you don’t already have it.

Run the rtpMIDI app.

Add a new session by clicking the plus sign, rename it and activate it by clicking the checkbox.

Make sure you set the option “who may connect to me” to either “anyone” or “only computers in my directory”.

Now start the TB MIDI Stuff app on the iPad.

Your iPad’s name will now appear in the Directory.

Click your iPad’s name then click the connect button.

Your iPad’s name will now appear in the Participants section.

You can now close the rtpMIDI window.

Open the global settings on TB MIDI Stuff app (the wrench icon on the toolbar) and select the created session for “MIDI In” and “MIDI Out”.

Missing Link™ Setup

Using the Missing Link™ with TB MIDI Stuff is simple as toggle «ON» a switch.

When the Missing Link™ is enabled, you can select it as MIDI Input and/or MIDI Output in Application Settings, Page Settings or MIDI setup on built-in controllers.

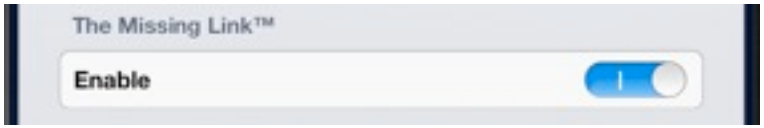
You don’t need to do more. No OSC IP Address nor IN/OUT Ports nor OSC messages to set : **TB MIDI STUFF DO IT ALL FOR YOU !!!**

All MIDI pages can be used with or without the Missing Link™ without any modifications.

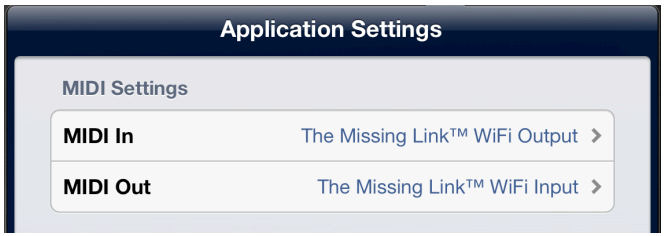
To use the Missing Link™ :

1. Connect your device to the Missing Link™ WiFi network (please read http://wifimidi.com/setup/)

2. Enable the Missing Link™ in Application Settings ( )



3. Select the Missing Link™ as MIDI In and/or MIDI Out in Application Settings, Page Settings or MIDI setup on built-in controllers settings.



NOTE : The current Missing Link™ OS handles SysEx messages sending but not yet SysEx messages receiving. So you can't do bidirectional SysEx with it.

OSC Setup

TB MIDI Stuff Side :

1. Enable OSC in Application Settings ( )

2. Set the Host IP address

3. Set the Out Port (on which the Host receive OSC messages)

4. Set the In Port (on which TBMS sends OSC messages)

OSC Host Side :

1. Set TB MIDI Stuff IP address to the Host (showed in TBMS as «Local IP Address» in Application Settings)

2. Set the Out Port to the one you set as OSC «In Port» on TBMS

NOTE : TB MIDI Stuff use UDP protocol to transport OSC messages.

First Launch

When you launch TB MIDI Stuff for the first time, it begins with control selector images building regarding to your device screen resolution. It takes less than a minute and will never do it again until a future version adds new controls.

When the main screen appears, TBMS is ready to do what you want to do with it.

IMPORTANT NOTE : By default, MIDI In is set to «None». Set it to another driver to activate MIDI bi direction.

Main Screen

Toolbar

	Go to Left page (if any)
	Go to Right page (if any)
	Go to/Quit Pages Manager
	Add/Load/Import/Export Pages & Canvas Snapshots
	Show/Hide Built-In Keyboard
	Show/Hide Built-In Pads Controller
	Show/Hide Built-In 16-Channels MIDI Mixer
	Show Instant Messenger
	Show the current page's name and Show Page Settings when tapped
	Enter Page Editor
	Show Tempo Popover
	Show Application Settings
	Panic
	Go to Up page (if any)
	Go to Down page (if any)

Tempo Popover

This popover allows you to set the tempo of the built-in sequencer which drive all arpeggiator/repeat tracks. The tempo range is [30; 260].

Panic

It sends «All Notes Off» and «All Sounds Off» messages on all MIDI out drivers. It also send «Note Off» messages for all pending notes and mute all tracks of the internal sequencer (i.e. all arpeggiator/repeat tracks).

You can tap on «Panic» button whereas you are in TBMS.

Built-in Controllers

Keyboard

The built-in keyboard responds to velocity via the accelerometer. It includes an arpeggiator which can be synchronized with an external device (MIDI Start, MIDI Continue, MIDI Clock and MIDI Stop).

If you plug a master keyboard to the MIDI In driver of the application and use the same channel than the built-in keyboard, you can drive the arpeggiator with this master keyboard in the same time you use the built-in keyboard.

By default, the left wheel sends CC#1 (Modulation Wheel) and the right wheel sends pitch bend.

Arpeggiator Panel

The Tempo and the Sync state are the sequencer global values (see Tempo Popover).

Settings Panel

Ribbon Panel

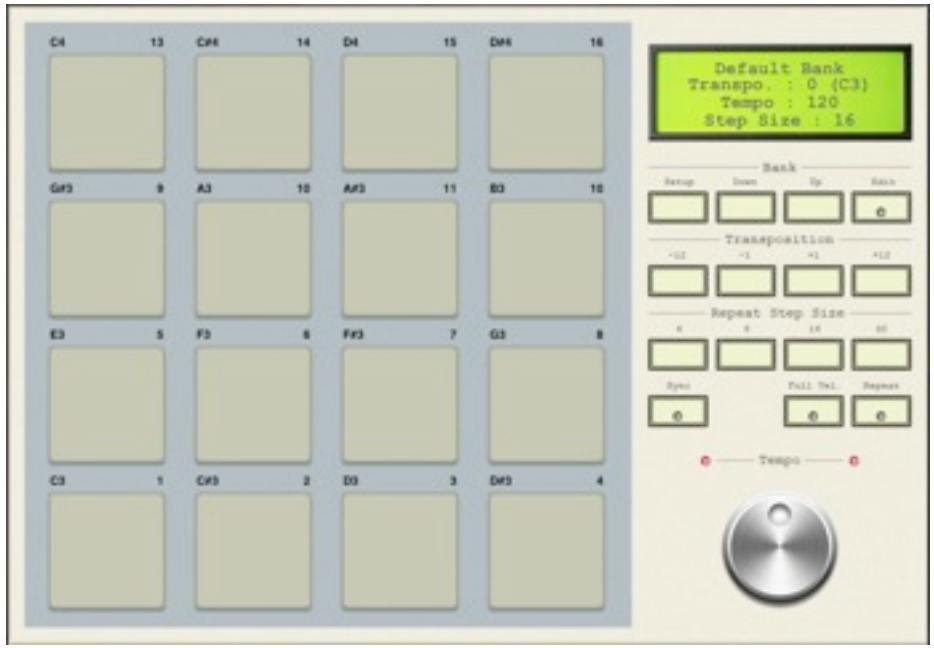
When Edit is on, you just need to tap on the ribbon to configure it (i.e. steps count, mode and sent MIDI messages).

Knobs Panel

When Edit is on, you just need to tap on the ribbon to configure it (i.e. name, steps count and sent MIDI messages).

Note : When edit is on, you can also configure the two left wheels. you just need to tap on one of them to show the wheel settings.

Pads Controller



Pads Controller lets you play without standard keyboard. You can use it to drive a drum kit for example.

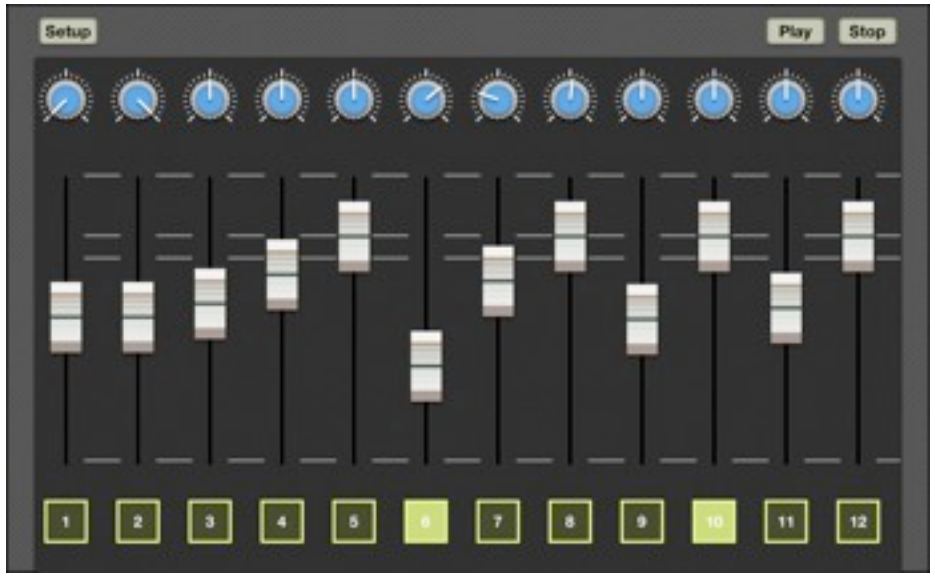
It use pads bank so you can configure it like you want. Each pad can hit any notes or MIDI messages you like (you can play one pad chord).

The repeat function lets you to repeat pads note at a fixed step size (if you tap multiple times on an step size, you can switch with normal, pointed and triolet value of the step size).

Pads can respond to accelerometer velocity or to five other mode. The «Full Vel.» button sets the velocity to the maximum value (127) at any time.

The Tempo and the Sync state are the sequencer global values (see Tempo Popover).

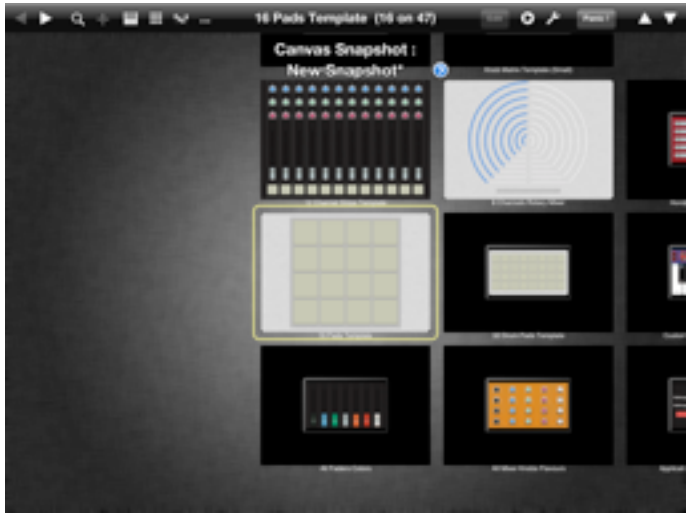
MIDI Mixer



The 16 channels MIDI mixer provides three controls per MIDI channel : a knob (PAN), a fader (VOLUME) and a toggle button (MUTE, SOLO, etc.). You can choose what control change number is assigned to each kind of control in the mixer setup (by default, knob CC is set to CC#10, fader CC is set to CC#7 and button is set to CC#9).

You can scroll the window to show the 16 channels (only 12 are show).

Pages Manager



This view show the pages placement on a 2D grid.

Pages Management

To reorder or close pages, press and hold the screen until all pages «dance» and a cross mark appear on all pages.

You can move a page with drag it to the new place.

Save a Canvas Snapshot

Tap on the blue arrow to show the canvas snapshot settings, the tap on the «Save» button.

Note : Canvas snapshot does not use symbolic link to pages but embed the pages current versions in a single file. We highly recommend to save each page to prevent to lose they if you delete a canvas snapshot.

Instant Messenger

Page Editor

This is the place you design your own pages. The Page Editor allow you to add, remove, move, resize or edit controls, add or modify user variables.

User Facilities

1. Move/Resize gesture

When you move or resize a control, it may be hard to get the position or the size you want, especially when «Snap To Grid» is «Off» (when your finger leave the screen, the touch point can change). To avoid this, you can stop the move/resize gesture with adding a second touch.

2. Valued Sliders

TBMS use a lot of valued sliders to set all numerical properties. Even if these sliders use steps feature, it is not necessary easy to set the value to a precise one, some of sliders have a large range (as example, «Steps Count» sliders have a range between 2 and 65536).

To help your editing, TBMS add a simple toggle gesture : you can switch all valued sliders to a numeric entry with a double tap on they. Another double tap switch back to a slider entry.

3. Control Selector

You can quickly open the Control Selector if you double tap an empty zone on the page.

Controls Selection

You can select more than one control at the same time. To add a control to the selection, you can use the «Selection» button on the toolbar or just press and hold the new control to add it to the selection.

User's Variables

In page settings, you can add page's user variables. You can set MIDI and OSC messages to a variable so you can do advanced behavior like increment/decrement buttons for a specified value.

Custom Image Background

To use Custom Image Background, you need to copy your image files (supported file type : tiff, jpeg, gif, png, bmp, ico, cur and xbm) to the iTunes Document Folder.

All added images now appear in Background Image List.

See Custom Look Images for more information.

To reduce page file size, only a reference to the image is stored with the page. Be careful and don't remove an image which is used by pages.

NOTE : When you send a page via E-Mail or when you export it to the iTunes Document Folder, all custom images is embedded into the page.

To obtain the best visual result, we recommend to use one of these image dimensions (other image dimensions will be stretched to fit the page size) :

	Non Retina	Retina
iPad	1024 x 724	2048 x 1448
iPhone / iPod Touch 3.5“	480 x 276	960 x 552
iPhone / iPod Touch 4“	-	1136 x 552

Controls Library

Control Name Consideration

All controls have a user defined name. TB MIDI Stuff does not use this name to identify a control (it uses an internal unique identifier). So all control user names don't need to be unique.

However, we encourage you to use relevant control names.

Routing Modes

TB MIDI Stuff allows you to transform some controls to be active ones. In this way, when a control receive a MIDI and/or an OSC message, it acts like an user input on this control. This parameter is not a global one, and is set to «None» by default on every control.

Routing Modes are one on the following :

- None (does nothing with incoming messages)
- MIDI In (process incoming MIDI messages as user inputs, i.e. sends control's MIDI/OSC messages)
- OSC In (process incoming OSC messages as user inputs, i.e. sends control's MIDI/OSC messages)
- MIDI In & OSC In (process incoming MIDI and OSC messages as user inputs, i.e. sends control's MIDI/OSC messages)

IMPORTANT NOTE : When Routing Mode is set to a value different to «None», it may do closed loop if devices you use with TBMS echo back of all incoming messages. This is particularly true with DAW softwares which do MIDI thru.

NOTE : Routing Modes are only processed on the current page.

Sliders

Basics

Technical Considerations

Internally, TBMS use only one slider control type, even if it allow you to use different kind. In fact, this slider use styles to change its look and its behavior. This is why you can switch between them when you want.

We add a limitation to preserve visual kind compatibility : you can't switch from a rotary one to a horizontal or vertical one, even if it is the same internal control.

Inputs

A slider can use one of the eight possible inputs :

- Touch
- X Accelerometer (*)
- Y Accelerometer (*)
- Z Accelerometer (*)
- Yaw (*, **)
- Pitch (*, ***)
- Roll (*, ***)
- None : the value slider can be only modified with a incoming MIDI, OSC or Variable message.

(*) Even if you choose accelerometer's value or gyroscope's value, you can temporary change the slider value with a touch. The slider will go back to the chosen sensor current value when your finger leave the screen.

(**) Only available with device with a gyroscope.

(***) On iPad 1st gen, Pitch and Roll are simulated with the accelerometer.

Custom Tooltips

Sliders can use user defined tooltips. You just need to set the ordered array of texts you want as tooltips.

Custom tooltips does not use the Steps Count you set but select the entry with the slider's value with linear interpolation (see Math behind the scene).

Rotary Sliders

Globals	
Name	Control User Name
Panel	None | [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
Default Value	[0; Steps Count - 1]

Visual	
Style	iOS Rotary Knob | Classic Knob | Mixer Knob | Black Knob | Modern Rotary Slider | Custom Look Knob
Range Color (*)	RGB Color
Knob Color / Color (*)	RGB Color
Thumb Color (*)	RGB Color

Visual	
Range Width (*)	[2.0; 20.0]
Custom Image (**)	(See Custom Look Images for more information)
Optimal Size (**)	For information purpose only
Tooltip	Off / On (When «On» shows a tooltip when the user changes the control's value)
Tooltips Wizard	(See Tooltips Wizards for more information)
Use Custom Tooltips	Off / On
Custom Tooltips	Custom Tooltips Array

Behavior	
Steps Count	[2; 65536]
Input	Touch | X Accelerometer | Y Accelerometer | Z Accelerometer | Yaw | Pitch | Roll | None
Routing Mode	None | MIDI In | OSC In | MIDI In & OSC In
Symmetric	Off /On
Invert	Off (Left to Right) /On (Right to Left)
Spring	None | Center | Default

Accelerometer	
Sensitivity	Sets the accelerometer sensitivity for this control

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

Touch MIDI Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
Send Only On Values	Off / On (When «On», Touch MIDI messages are only sent when you touch the control)
MIDI Messages	See MIDI Messages for available messages

Touch OSC Messages	
OSC Messages	See OSC Messages for available messages

(*) Notes :
•Range Color : available with «Mixer Knob» and «Black Knob» styles only.
•Knob Color / Color : available with «Mixer Knob», «Classic Knob» and «Modern Rotary Slider» styles only.
•Thumb Color : available with «Mixer Knob», «Classic Knob» and «Black Knob» styles only.
•Range Width : available with «iOS Rotary Slider» style only.

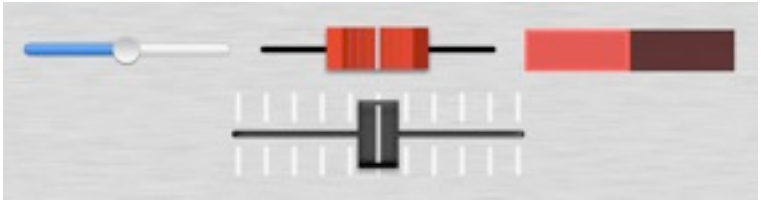
(**) Custom Look knobs only

Available Control's Variables	
Name	Range
Symmetric	[0; 1]
Spring	[0; 2]
Routing Mode	[0; 3]
Invert	[0; 1]
Input	[0; 7]
Value (*, **)	[0; Steps Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Horizontal Sliders



Globals	
Name	Control User Name
Panel	None ⁞ [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
Default Value	[0; Steps Count - 1]

Visual	
Style	iOS Horizontal Slider ⁞ Modern Horizontal Slider ⁞ Horizontal Fader
Knob Color / Color (*)	RGB Color
Thumb Color (*)	RGB Color
Range Width (*)	[2.0; 20.0]

Visual	
Custom Image (**)	(See Custom Look Images for more information)
Frames Count (**)	[2; 512]
Optimal Size (**)	For information purpose only
Tooltip	Off / On (When «On» shows a tooltip when the user changes the control's value)
Tooltips Wizard	(See Tooltips Wizards for more information)
Use Custom Tooltips	Off / On
Custom Tooltips	Custom Tooltips Array

Behavior	
Steps Count	[2; 65536]
Input	Touch ⁞ X Accelerometer ⁞ Y Accelerometer ⁞ Z Accelerometer ⁞ Yaw ⁞ Pitch ⁞ Roll ⁞ None
Routing Mode	None ⁞ MIDI In ⁞ OSC In ⁞ MIDI In & OSC In
Symmetric (*)	Off /On
Invert	Off (Left to Right) /On (Right to Left)
Spring	None ⁞ Center ⁞ Default

Accelerometer	
Sensitivity	Sets the accelerometer sensitivity for this control

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

Touch MIDI Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
Send Only On Values	Off / On (When «On», Touch MIDI messages are only sent when you touch the control)
MIDI Messages	See MIDI Messages for available messages

Touch OSC Messages	
OSC Messages	See OSC Messages for available messages

(*) Notes :

•Knob Color / Color : available with «Modern Horizontal Slider» and «Horizontal Fader» styles only.

•Thumb Color : available with «Horizontal Fader» style only.

•Symmetric : available with «iOS Horizontal Slider» and «Modern Horizontal Slider» styles only.

•Range Width : available with «iOS Horizontal Slider» style only.

(**) Custom Look knobs only

Available Control's Variables	
Name	Range
Symmetric	[0; 1]
Spring	[0; 2]
Routing Mode	[0; 3]
Invert	[0; 1]
Input	[0; 7]
Value (*, **)	[0; Steps Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Vertical Sliders

Globals	
Name	Control User Name
Panel	None ǀ [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
Default Value	[0; Steps Count - 1]

Visual	
Style	iOS Vertical Slider ǀ Modern Vertical Slider ǀ Vertical Fader
Knob Color / Color (*)	RGB Color
Thumb Color (*)	RGB Color
Range Width (*)	[2.0; 20.0]

Visual	
Custom Image (**)	(See Custom Look Images for more information)
Frames Count (**)	[2; 512]
Optimal Size (**)	
Tooltip	Off / On (When «On» shows a tooltip when the user changes the control's value)
Tooltips Wizard	(See Tooltips Wizards for more information)
Use Custom Tooltips	Off / On
Custom Tooltips	Custom Tooltips Array

Behavior	
Steps Count	[2; 65536]
Input	Touch ǀ X Accelerometer ǀ Y Accelerometer ǀ Z Accelerometer ǀ Yaw ǀ Pitch ǀ Roll ǀ None
Routing Mode	None ǀ MIDI In ǀ OSC In ǀ MIDI In & OSC In
Symmetric (*)	Off /On
Invert	Off (Left to Right) /On (Right to Left)
Spring	None ǀ Center ǀ Default

Accelerometer	
Sensitivity	Sets the accelerometer sensitivity for this control

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

Touch MIDI Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
Send Only On Values	Off / On (When «On», Touch MIDI messages are only sent when you touch the control)
MIDI Messages	See MIDI Messages for available messages

Touch OSC Messages	
OSC Messages	See OSC Messages for available messages

(*) Notes :
•Knob Color / Color : available with «Modern Vertical Slider» and «Vertical Fader» styles only.
•Thumb Color : available with «Vertical Fader» style only.
•Symmetric : available with «iOS Vertical Slider» and «Modern Vertical Slider» styles only.
•Range Width : available with «iOS Vertical Slider» style only.

(**) Custom Look knobs only

Available Control's Variables	
Name	Range
Symmetric	[0; 1]
Spring	[0; 2]
Routing Mode	[0; 3]
Invert	[0; 1]
Input	[0; 7]
Value (*, **)	[0; Steps Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Pads

X/Y Pads

Custom Tooltips

X/Y Pads can use user defined tooltips. You just need to set the ordered array of texts you want as tooltips.

Custom tooltips does not use the Steps Count you set but select the entry with the X/Y Pad's value with linear interpolation (see Math behind the scene).

Globals	
Name	Control User Name
Panel	None | [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
X Default Value	[0; X Steps Count - 1]

Globals	
Y Default Value	[0; Y Steps Count - 1]

Visual	
Hide Cross	Off / On
Tooltip	Off / On (When «On» shows a tooltip when the user changes the control's value)
X Tooltips Wizard	(See Tooltips Wizards for more information)
Y Tooltips Wizard	(See Tooltips Wizards for more information)
Use X Custom Tooltips	Off / On
X Custom Tooltips	X Custom Tooltips Array
Use Y Custom Tooltips	Off / On
Y Custom Tooltips	Y Custom Tooltips Array

Behavior	
X Steps Count	[2; 65536]
Y Steps Count	[2; 65536]
X Input	Touch | X Accelerometer | Y Accelerometer | Z Accelerometer | Yaw | Pitch | Roll | None

Behavior	
Y Input	Touch | X Accelerometer | Y Accelerometer | Z Accelerometer | Yaw | Pitch | Roll | None
Routing Mode	None | MIDI In | OSC In | MIDI In & OSC In
X Spring	None | Center | Default
Y Spring	None | Center | Default

Accelerometer	
Sensitivity	Sets the accelerometer sensitivity for this control

X-Axis MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

Y-Axis MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

X/Y OSC Messages	
OSC Messages	See OSC Messages for available messages

X-Axis Variable Messages	
Variable Messages	See Variable Messages for available messages

Y-Axis Variable Messages	
Variable Messages	See Variable Messages for available messages

Touch MIDI Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
Send Only On Values	Off / On (When «On», Touch MIDI messages are only sent when you touch the control)
MIDI Messages	See MIDI Messages for available messages

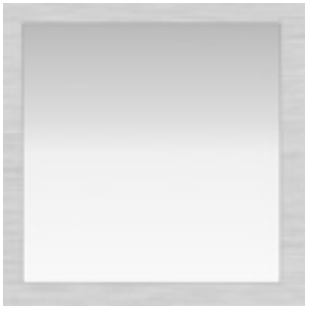
Touch OSC Messages	
OSC Messages	See OSC Messages for available messages

Available Control's Variables	
Name	Range
Routing Mode	[0; 3]
X Spring	[0; 2]
Y Spring	[0; 2]
Hide Cross	[0; 1]
X Input	[0; 7]
Y Input	[0; 7]
X Value (*, **)	[0; X Steps Count - 1]
Y Value (*, **)	[0; Y Steps Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Multitouch X/Y Pads



Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Behavior	
X Steps Count	[2; 65536]
Y Steps Count	[2; 65536]

Global Touch MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)

Global Touch MIDI Messages	
Value Notes	See Value Notes

Global X/Y OSC Messages (Indexed)	
OSC Messages	See OSC Messages for available messages

Global Touch OSC Messages (Indexed)	
OSC Messages	See OSC Messages for available messages

X-Axis MIDI Messages	
First Touch Mute	Off / On (When «On», no MIDI messages are sent)
First Touch Messages	See MIDI Messages for available messages
Second Touch Mute	Off / On (When «On», no MIDI messages are sent)
Second Touch Messages	See MIDI Messages for available messages
Third Touch Mute	Off / On (When «On», no MIDI messages are sent)
Third Touch Messages	See MIDI Messages for available messages
Fourth Touch Mute	Off / On (When «On», no MIDI messages are sent)
Fourth Touch Messages	See MIDI Messages for available messages
Fifth Touch Mute	Off / On (When «On», no MIDI messages are sent)
Fifth Touch Messages	See MIDI Messages for available messages

Y-Axis MIDI Messages	
First Touch Mute	Off / On (When «On», no MIDI messages are sent)
First Touch Messages	See MIDI Messages for available messages
Second Touch Mute	Off / On (When «On», no MIDI messages are sent)
Second Touch Messages	See MIDI Messages for available messages
Third Touch Mute	Off / On (When «On», no MIDI messages are sent)
Third Touch Messages	See MIDI Messages for available messages
Fourth Touch Mute	Off / On (When «On», no MIDI messages are sent)
Fourth Touch Messages	See MIDI Messages for available messages
Fifth Touch Mute	Off / On (When «On», no MIDI messages are sent)
Fifth Touch Messages	See MIDI Messages for available messages

X/Y OSC Messages	
First Touch Messages	See OSC Messages for available messages
Second Touch Messages	See OSC Messages for available messages

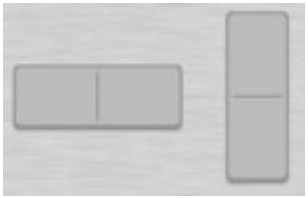
X/Y OSC Messages	
Third Touch Messages	See OSC Messages for available messages
Fourth Touch Messages	See OSC Messages for available messages
Fifth Touch Messages	See OSC Messages for available messages

Touch MIDI Messages	
First Touch Mute	Off / On (When «On», no Touch MIDI messages are sent)
First Touch Messages	See MIDI Messages for available messages
Second Touch Mute	Off / On (When «On», no Touch MIDI messages are sent)
Second Touch Messages	See MIDI Messages for available messages
Third Touch Mute	Off / On (When «On», no Touch MIDI messages are sent)
Third Touch Messages	See MIDI Messages for available messages
Fourth Touch Mute	Off / On (When «On», no Touch MIDI messages are sent)
Fourth Touch Messages	See MIDI Messages for available messages
Fifth Touch Mute	Off / On (When «On», no Touch MIDI messages are sent)

Touch MIDI Messages	
Fifth Touch Messages	See MIDI Messages for available messages

Touch OSC Messages	
First Touch Messages	See OSC Messages for available messages
Second Touch Messages	See OSC Messages for available messages
Third Touch Messages	See OSC Messages for available messages
Fourth Touch Messages	See OSC Messages for available messages
Fifth Touch Messages	See OSC Messages for available messages

Ribbons



Custom Tooltips

X/Y Pads can use user defined tooltips. You just need to set the ordered array of texts you want as tooltips.

Custom tooltips does not use the Steps Count you set but select the entry with the X/Y Pad's value with linear interpolation (see Math behind the scene).

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
Default Value	[0; Steps Count - 1]

Visual	
Color	RGB Color
Tooltip	Off / On (When «On» shows a tooltip when the user changes the control's value)
Tooltips Wizard	(See Tooltips Wizards for more information)

Visual	
Use Custom Tooltips	Off / On
Custom Tooltips	Custom Tooltips Array

Behavior	
Steps Count	[2; 65536]
Symmetric	Off /On
Mode	Absolute | Relative
Hold	Off /On

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

Touch MIDI Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
Send Only On Values	Off / On (When «On», Touch MIDI messages are only sent when you touch the control)
MIDI Messages	See MIDI Messages for available messages

Touch OSC Messages	
OSC Messages	See OSC Messages for available messages

Available Control's Variables	
Name	Range
Symmetric	[0; 1]
Mode	[0; 1]
Hold	[0; 1]
Value (*, **)	[0; Steps Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Drum Pads

Globals	
Name	Control User Name
Panel	None | [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Style	Drum Pad | Modern Drum Pad | White Piano Key | Black Piano Key

Visual	
Shape (*)	Rectangle | Up Arrow | Down Arrow | Left Arrow | Right Arrow | Ellipse | Diamond | Hexagon 1 | Hexagon 2
Color (*)	RGB Color
Dynamic Color (*)	Off / On
Notes Color Messages (*)	(See Dynamic Colors)
Custom Image (**)	(See Custom Look Images for more information)
Optimal Size (**)	For information purpose only
Dynamic Image (***)	Off / On
Notes Image Messages (***)	(See Dynamic Images)

Behavior	
Touch Capture	Off / On
Local Feedback	Off / On
Velocity Mode	Same As Page | Accelerometer | Bottom | Top (*) | Left (*) | Right (*) | Center (*)
Toggle	Off / On (See Toggle Groups)
Toggle Group	None | [1; 256] (See Toggle Groups)
Send Only On Values	Off / On

Behavior	
Routing Mode	None ⁞ MIDI In ⁞ OSC In ⁞ MIDI In & OSC In

Aftertouch	
Sensitivity	Sets the aftertouch sensitivity for this control

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Touch Messages	
Variable Messages	See Variable Messages for available messages

X-Axis Tracking MIDI Messages (****)	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

Y-Axis Tracking MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

X/Y Tracking OSC Messages (*****)	
OSC Messages	See OSC Messages for available messages

MIDI Aftertouch Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Aftertouch Messages	
OSC Messages	See OSC Messages for available messages

(*) Drum Pad and Modern Drum Pad styles only
(**) Custom Look Drum Pads and White/Black Piano Key styles only
(***) Custom Look Drum Pads only
(****) Drum Pad, Modern Drum Pad and Custom Loog Drum Pad styles only
(*****) Y Tracking OSC Messages with White Piano Key and Black Piano Key styles

Available Control's Variables	
Name	Range
Routing Mode	[0; 3]
Toggle	[0; 1]

Available Control's Variables	
Toggle Group	[0; 256]
Value (*, **)	[0; 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Dynamic Colors

Dynamic Images

Dynamic Images use the same principle as Dynamic Colors but with custom images in place of colors.

Toggle Groups

Keyboards

Piano Keyboards

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Note Labels	None | Root Keys | White Keys | Black Keys | All Keys
Keyboard Offset	
Key Width	[50; 120]

Visual	
White Custom Image	(See Custom Look Images for more information)
Black Custom Image	(See Custom Look Images for more information)
Black Key Width %	[10; 100]
Black Key Height %	[25; 75]

Behavior	
MIDI Channel	Same As Page | [1; 16]
MIDI In	Off / On
Hold	Off / On
Glissendo	Off / On
Velocity Mode	Same As Page | Accelerometer | Bottom
Min Velocity	[1; 127]
Max Velocity	[1; 127]
Transposition	[-24; 24]

Arpeggiator	
On	Off / On
Type	Classic | Repeat
Mode	Up | Down | Up & Down | Random | Played Order

Arpeggiator	
Step Size	4. | 4 | 4T | 8. | 8 | 8T | 16. | 16 | 16T | 32. | 32 | 32T
Step Duration %	[1; 100]
Octave	[1; 4]

Aftertouch	
Sensitivity	Sets the aftertouch sensitivity for this control

Y-Axis Tracking MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

Y Tracking OSC Messages	
OSC Messages	See OSC Messages for available messages

MIDI Aftertouch Messages	
Mute	Off / On (When «On», no Touch MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Aftertouch Messages	
OSC Messages	See OSC Messages for available messages

Available Control's Variables	
Name	Range
Note Labels	[0; 4]
Keyboard Offset	[0; 70]
White Key Width	[40; 120]
MIDI In	[0; 1]
Hold	[0; 1]
Glissendo	[0; 1]
Min Velocity	[1; 127]
Max Velocity	[1; 127]
Transposition	[-24; 24]
Arpeggiator On	[0; 1]
Arpeggiator Type	[0; 1]
Arpeggiator Mode	[0; 4]
Arpeggiator Step Size	[0; 11]
Arpeggiator Step Duration	[1; 100]
Arpeggiator Octave	[1; 4]

Piano Keys

Piano Keys are Drum Pads styles (see Drum Pads).

Note that X Tracking Messages are not available with these styles.

Adorners

Rounded Rects

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Border Color	RGBA Color
Line Width	[1.0; 10.0]
Corner Radius	[0.0; 40.0]
Color	RGBA Color
Opacity %	[10.00; 100.00] (Global Opacity)

Labels

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Prefix Text	
Text	(part of text which can be dynamic)
Suffix Text	
Text Color	RGB Color
Alignment	Left | Center | Right
Font Size	[10.0; 48.0]
Font Name	
Font Style	

Visual	
Rotation	[-90.0; 90.0]

MIDI Messages	
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Binders	
Bound Variables	See Variable Messages for available messages

Images

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Image	(See Custom Look Images for more information)
Optimal Size	For information purpose only
Opacity %	[10.00; 100.00] (Global Opacity)

Misc

Jog Wheels

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Style	Standard | Custom Look
Custom Image (*)	(See Custom Look Images for more information)
Optimal Size (*)	For information purpose only

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

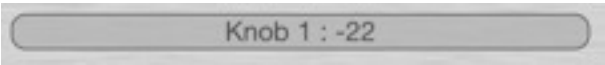
(*) Custom Look Jog Wheel only

LCD Value Displays

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Behavior	
Filtered Controls	

Banner Value Displays



Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Behavior	
Filtered Controls	

Pick Lists

Globals	
Name	Control User Name
Panel	None | [1; 128]
Can Be Randomized	Off / On
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)
Values	

Visual	
Line Width	[1.0; 10.0]
Corner Radius	[0.0; 40.0]
Border Color	RGB Color
Background Color	RGBA Color
Color	RGB Color
Font Size	[10.0; 48.0]

Visual	
Font Name	
Font Style	

MIDI Messages	
Mute	Off / On (When «On», no MIDI messages are sent)
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Messages	
Variable Messages	See Variable Messages for available messages

Available Control's Variables	
Name	Range
Value (*, **)	[0; Values Count - 1]

(*) Only usable with Hidden Conditions and Labels

(**) Bound Labels will show Custom Tooltip strings if any.

Leds

Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Style	Circular Led | Rectangular Led | Custom Look Led
Color (*)	RGB Color
Custom Image (**)	(See Custom Look Images for more information)
Frames Count (**)	[2; 512]
Optimal Size (**)	For information purpose only

MIDI Messages	
MIDI Messages	See MIDI Messages for available messages

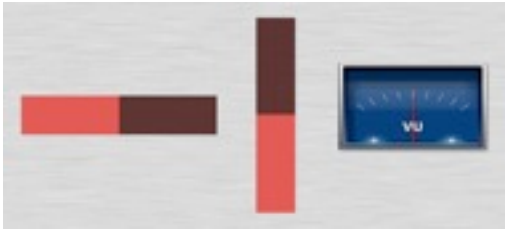
OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Binders	
Bound Variables	See Variable Messages for available messages

(*) Circular Led and Rectangular Led styles only

(**) Custom Look Led only

Meters



Globals	
Name	Control User Name
Panel	None | [1; 128]
Hidden	Off / On
Hidden Condition	Hidden Condition Settings (if any) (See Hidden Conditions)

Visual	
Style	Horizontal Meter | Vertical Meter | Custom Look Meter
Color (*)	RGB Color
Custom Image (**)	(See Custom Look Images for more information)
Frames Count (**)	[2; 512]
Optimal Size (**)	For information purpose only

MIDI Messages	
MIDI Messages	See MIDI Messages for available messages

OSC Messages	
OSC Messages	See OSC Messages for available messages

Variable Binders	
Bound Variables	See Variable Messages for available messages

(*) Horizontal Meter and Vertical Meter styles only

(**) Custom Look Meter only

Tooltips Wizards

Custom Look Images

TB MIDI Stuff use PNG with Alpha, vertical aligned frames images.

Example of a knob image :

You can use your favorite bitmap editor to draw your controls. We recommend Knobman which is specialized to draw knobs, slider and other. (http://www.g200kg.com/en/software/knobman.html).

NOTE FOR MAC USERS : the dmg files for Knobman seems to be corrupted, so you can use the jar version (Java).

Frames count

The frames count range depends on control's type. It is not linked to the control's steps count, so you can use different values. As example, you can design a three-states slider and only use it with a steps count of two (the middle position will be avoided in this case).

Control Type	Minimum Frames Count	Maximum Frames Count
Knob	2	512
Horizontal Slider	2	512
Vertical Slider	2	512
Drum Pad	2	2
White Piano Key	2	2
Black Piano Key	2	2
Led	2	512
Meter	2	512
Jog Wheel (*)	2	512

(*) With Jog Wheels, the frames count also define the steps-per-revolution so, don't use a too higher frames count (24 or 48 is a good choice).

NOTE : TBMS store the last set frames count for an image, so, you just need to set it once.

IMPORTANT NOTE : Custom Look Knobs and Custom Look Jog Wheels must use squared frames (in this case, TBMS can automatically determine the frames count by dividing the image's height with the image's width).

Retina supports

iOS natively provides a filename suffix method to handle non-retina/retina version of an image. This method is to provide the image in both resolution and set the suffix «@2x» to the retina image. It will automatically load the good image on the fly. TB MIDI Stuff can use this method so you can add the two image's versions.

An example is :

- knob@@My Beautiful Knob.png
- knob@@My Beautiful Knob@2x.png

Filename decoration prefix

All custom images are stored in the iTunes Documents Folder. As iTunes does not handle well sub folders, we choose to add a decoration prefix to classify images.

Control Type	Filename Prefix
Image	image@@
Background	background@@
Knob	knob@@
Horizontal Slider	hslider@@
Vertical Slider	vslider@@
Drum Pad	drumpad@@
White Piano Key	whitekey@@
Black Piano Key	blackkey@@
Led	led@@
Meter	meter@@
Jog Wheel	jogwheel@@

Note : Images files which don't have a decoration prefix can be only used with Image controls or as custom page background

Images library import

When you import an image from the iPad's images library, you first choose what kind of control the image is for. Then, you select the image and set the image name. You don't need to set the decoration prefix, TBMS will automatically add it.

The imported image is stored in the iTunes Documents Folder.

Pages/Canvas Snapshot export considerations

When you export to the iTunes Documents Folder or when you share pages/canvas snapshot by email, TBMS embed all custom images in the file so you don't need to provide your graphics with another way.

MIDI Messages

TB MIDI Stuff use advanced MIDI messages representations to simplify MIDI usages. As example, Control Change Coarse/Fine is an easy way to send two Control Change Message with a whole 14 bits value.

TBMS allows you to set any count of MIDI messages to a control. As example, you can do a MIDI crossfader with two CC#7 messages (one from 0 to 127, the other one from 127 to 0). Another example is to drive multiple parameters with the same control.

When you use a MIDI message with the value of a control, you can specify what kind of bi direction you want with «**Mode**» entry : «**Send and Receive**» which is fully bidirectional, «**Send Only**» (no bi direction) and «**Receive Only**» (no bi direction but update control's value).

With setting the «**Routing Mode**» on compatible controls, you can use the message «**Mode**» to convert a message to another on (the first message is set to «**Send Only**» and another one is set to «**Receive Only**»). This allows you to do messages conversion without the need of a MIDI patch bay.

You can also convert a MIDI message to an OSC message and vice versa.

IMPORTANT NOTE : TB MIDI Stuff doesn't have any «Learn» function : you need to configure yourself all MIDI messages.

IMPORTANT NOTE : Be careful with «Routing Mode» because it can do MIDI closed loops if your MIDI configuration send back all messages sent by TB MIDI Stuff (which will freeze the app until the closed loop will be broken).

NOTE : To know how TB MIDI Stuff calculate message values and process bi direction, see Maths behind the scene.

Difference between standard and signed messages

The MIDI specification doesn't specify any method to represent negative values. The standard way is to use an offset of 64 (with 7bits values) so we have a linear way to represent values in range [-64; 63].

Some device manufacturers, like Alesis with their Micron synthesizer, use another way : signed values (well known in computer science as two's complement representation, see Math behind the scene to know more about it).

Most of MIDI controllers don't handle this representation and don't allow you to have a real linear control curve.

TBMS do ! You can use set on the signed switch of compatible messages to ensure that the sent value conforms to the correct control curve used by your device.

Control Change Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Operand	[0; 127]
Signed	Off, On (See Signed Values for more information)
Filter Same Value	Off, On
Minimum / Off Value	[0; 127] with unsigned value, [-64; 63] with signed value
Maximum / On Value	[0; 127] with unsigned value, [-64; 63] with signed value

(*) Value MIDI Message only

MIDI bytes : Bc, mm, vv
(c : channel, mm : CC number, vv : value)

Control Change Messages for Jog Wheel Controls

Parameters	
Channel	Same As Page, [1; 16]
Operand	[0; 127]
Use Real Increment (*)	Off, On
Left Value Base (*)	[0; 127]
Right Value Base (*)	[0; 127]

(*) : the sent value is the sum of the wheel direction value (left or right) and the wheel's steps count. If you turn off «Use Real Increment», the steps count is always set to one.

Example:
Use Real Increment : Off
Left Value Base = 64
Right Value Base = 0

- Turn the wheel to the left will send 65 (64 + one step)
- Turn the wheel to the right will send 1 (0 + one step)

MIDI bytes : Bc, mm, vv
(c : channel, mm : CC number, vv : value)

Control Change Coarse/Fine Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Coarse Operand	[0; 127]
Fine Operand	[0; 127]
Signed	Off, On (See Signed Values for more information)
Filter Same Value	Off, On
Minimum / Off Value	[0; 16383] with unsigned value, [-8192; 8191] with signed value
Maximum / On Value	[0; 16383] with unsigned value, [-8192; 8191] with signed value

(*) Value MIDI Message only

MIDI bytes : Bc, mm, vv, Bc, nn, ww
(c : channel, mm : coarse CC number, vv : value MSB, nn : fine CC number, ww : value LSB)

RPN/NRPN Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Parameter MSB	[0; 127]
Parameter LSB	[0; 127]
NRPN	Off (RPN message), On (NRPN message)
Fine Value	Off (7 bits value), On (14 bits value)
Invert MSB / LSB	Off (standard way), On (MSB first)
Signed	Off, On (See Signed Values for more information)
Filter Same Value	Off, On
Minimum / Off Value	[0; 16383] with unsigned value, [-8192; 8191] with signed value
Maximum / On Value	[0; 16383] with unsigned value, [-8192; 8191] with signed value

(*) Value MIDI Message only

MIDI bytes :
Bc, 65, pm, Bc, 64, pl, Bc 06, vv, (RPN)
Bc, 65, pm, Bc, 64, pl, Bc 06, vv, Bc, 26, ww (RPN fine, Invert MSB/LSB Off)
Bc, 65, pm, Bc, 64, pl, Bc 26, vv, Bc, 06, ww (RPN fine, Invert MSB/LSB On)

Bc, 63, pm, Bc, 62, pl, Bc 06, vv, (NRPN)
Bc, 63, pm, Bc, 62, pl, Bc 06, vv, Bc, 26, ww (NRPN fine, Invert MSB/LSB Off)
Bc, 63, pm, Bc, 62, pl, Bc 26, vv, Bc, 06, ww (NRPN fine, Invert MSB/LSB On)
(c : channel, pm : parameter MSB, pl : parameter LSB, vv : value MSB, ww : value LSB)

Channel Pressure Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Filter Same Value	Off, On
Minimum / Off Value	[0; 127]
Maximum / On Value	[0; 127]

(*) Value MIDI Message only

MIDI bytes : Dc, vv
(c : channel, vv : value)

Pitch Bend Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Filter Same Value	Off, On
Minimum / Off Value	[0; 16383]
Maximum / On Value	[0; 16383]

(*) Value MIDI Message only

MIDI bytes : Ec, ww, vv
(c : channel, vv : value MSB, ww : value LSB)

Program Change Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Filter Same Value	Off, On
Minimum / Off Value	[0; 127]
Maximum / On Value	[0; 127]

(*) Value MIDI Message only

MIDI bytes : Cc, vv
(c : channel, vv : value)

Song Select Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Channel	Same As Page, [1; 16]
Filter Same Value	Off, On
Minimum / Off Value	[0; 127]
Maximum / On Value	[0; 127]

(*) Value MIDI Message only

MIDI bytes : F3, vv
(vv : value)

System Message Messages

Parameter	
Type	Tune Request, Start, Stop, Continue, Active Sensing, Reset

MIDI bytes :
F6 (Tune Request)
FA (Start)
FC (Stop)
FB (Continue)
FE (Active Sensing)
FF (Reset)

Note On/Off Messages

Parameters	
Channel	Same As Page, [1; 16]
Note	[C-2; G8]
Accelerometer Velocity	Off, On
Off Velocity	[1; 127]
On Velocity	[1; 127]

MIDI bytes :
9c, nn, vv (Note On)
8c, nn, 00 (Note Off)
(c : channel, nn : note, vv : velocity)

System Exclusive Messages

Parameters	
Name	User Defined Name (the one showed in the MIDI messages array)
Mode (*)	Send and Receive, Send Only, Receive Only
Message Header	F0
Message	
Message Footer	F7
Signed	Off, On (See Signed Values for more information)
Filter Same Value	Off, On
Value Size in Bytes	One byte, Two bytes, Three bytes, Four bytes
Value Format Method	(See Value Size, Value Range and Value Format Method)
Header in Checksum	Off, On (See «Checksum Methods»)
Checksum Method	See «Checksum Methods»
Minimum/Off Value	(See Value Size, Value Range and Value Format Method)
Maximum/On Value	(See Value Size, Value Range and Value Format Method)
Always Send Request	Off, On (When «On», send the request every time the SysEx message was sent)
Request Header	F0
Request Message	If any
Request Footer	F7

(*) Value MIDI Message only

MIDI bytes : F0, [message], F7

Value Size, Value Range and Value Format Methods

Bytes Count		Format Methods	Min	Max
1	Unsigned	Linear	0	127
		Nibbles (Big Endian)	0	15
		Nibbles (Little Endian)	0	15
	Signed	Linear	-64	63
		Nibbles (Big Endian)	-8	7
		Nibbles (Little Endian)	-8	7
2	Unsigned	Linear	0	16383
		Nibbles (Big Endian)	0	255
		Nibbles (Little Endian)	0	255
	Signed	Linear	-8192	8191
		Nibbles (Big Endian)	-128	127
		Nibbles (Little Endian)	-128	127
3	Unsigned	Linear	0	131071
		Nibbles (Big Endian)	0	4095
		Nibbles (Little Endian)	0	4095
	Signed	Linear	-65536	65535
		Nibbles (Big Endian)	-2048	2047
		Nibbles (Little Endian)	-2048	2047
4	Unsigned	Linear	0	131071
		Nibbles (Big Endian)	0	65535
		Nibbles (Little Endian)	0	65535
	Signed	Linear	-65536	65535
		Nibbles (Big Endian)	-32768	32768
		Nibbles (Little Endian)	-32768	32768

Checksum Methods

TB MIDI Stuff needs to know where the checksum start to handle dynamic checksums (like Roland do for example).

You can choose one on the two following checksum methods :

• Normal, witch keep the 7 least significant bits of the calculated sum
• Two's Complement, witch subtract the 7 least significant bits of the calculated sum to 128 (0×80)
• XOR, which perform an XOR on all bytes between checksum start flag and checksum end flag.

'Checksum Start' key on the hexadecimal keyboard is here for mark the checksum start (represented in the message by 'CS').

'Checksum Stop' key is the calculated checksum (represented by 'CE') and must be the last byte in the message before the SysEnd end marker F7.

'CS' is just a marker and don't represent any bytes. 'CE' is replaced by the calculated checksum on the fly.

Take a GS Master Volume SysEx as an example. For a full volume value, the message is :

F0 41 10 42 12 40 00 04 7F 3D F7

41 is the corresponding manufacturer code of Roland
10 is the device id (most of Roland's device use this id)
42 is the model id (GS synth in our case)
12 specify we send a value
40 00 04 is the address of the parameter we want to change
7F is the volume value (full volume in this case
3D is the checksum

We don't want to always send full volume, so we change the 7F value by control value ('xx') :

F0 41 10 42 12 40 00 04 xx 3D F7

This new message will fail for every value than 7F because 3D is only the correct checksum value with 7F. We will change that point.

Roland devices start to calculate checksum with parameter address (40 00 04 in our case), so we put the checksum start just before it :

F0 41 10 42 12 CS 40 00 04 xx 3D F7

Then, we can replace 3D by the calculated checksum :

F0 41 10 42 12 CS 40 00 07 xx CE F7

We have to choose what calculation method we want to use. In our case (Roland GS SysEx message), the checksum method must be 'Two's Complement'.

We have now a correct SysEx message witch works with all volume values.

System Exclusive Messages for Label Controls

Parameters	
Name	User Defined Name (the one showed in the MIDI messages array)
Message Header	F0
Message	
Message Footer	F7
Text Length	
Text Position Offset	
Checksum Method	See «Checksum Methods»
Request Header	F0
Request Message	If any
Request Footer	F7

MIDI bytes : F0, [message], F7

Value Note Messages (TBMS special)

NOTE : **This kind of message does not represent a real MIDI message**. It's like a **dynamic Note On/Off message** regarding to the control's value. It allows you to convert a slider, a knob, a fader, a ribbon, a X/Y pads and a multitouch X/Y pads into a small piano keyboard with specified **Note Range**, **Root Key** and **Musical Scale**.

You can see «Value Note Demo 1» and «Value Note Demo 2» pages in «Other» section to test this kind of message in action.

Parameters	
Channel	Same As Page, [1; 16]
Minimum Note	[C-2; G8]
Maximum Note	[C-2; G8]
Predefined Scale	See «Available Predefined Scales»
Root Key	C, C#, D, D#, E, F, F#, G, G#, A, A#, B, Same As Page
Custom Scale	C | C# | D | D# | E | F | F# | G | G# | A | A# | B, Same As Page
Minimum Velocity	[1; 127]
Maximum Velocity	[1; 127]

Available Predefined Scales

Scale Name	Scale for C Root Key
Chromatic	C Db D Eb E F Gb G Ab A Bb B C
Ionian	C D E F G A B C
Dorian	C D Eb F G A Bb C
Phrygian	C Db Eb F G Ab Bb C
Lydian	C D E F# G A B C
Mixolydian	C D E F G A Bb C
Aeolian	C D Eb F G Ab Bb C
Locrian	C Db Eb F Gb Ab Bb C
Major Blues	C Eb E G A Bb C
Minor Blues	C Eb F Gb G Bb C
Diminish	C D Eb F F# G# A B C
Combination Diminish	C Db Eb E F# G A Bb C
Major Pentatonic	C D E G A C
Minor Pentatonic	C Eb F G Bb C
Raga Bhairav	C Db E F G Ab B C
Raga Gamanasrama	C Db E F# G A B C
Raga Todi	C Db Eb F# G Ab B C
Spanish	C Db Eb E F G Ab Bb C
Gypsy	C D Eb F# G Ab B C
Arabian	C D E F Gb Ab Bb C
Egyptian	C D F G Bb C
Hawaiian	C D Eb G A C
Bali Island Pelog	C Db Eb G Ab C
Japanese Miyakobushi	C Db F G Ab C
Ryukyu	C E F G B C
Wholetone	C D E Gb Ab Bb C
Minor 3rd Interval	C Eb Gb A C
3rd Interval	C E Ab C
4th Interval	C F Bb C

Scale Name	Scale for C Root Key
5th Interval	C G C
Octave Interval	C C
Custom	*User Defined Scale*
Same As Application	*Selected Page Scale (Page Settings)*

Available MIDI Messages per Control Type

Control Value MIDI Messages

	Sliders, Knobs and Faders	X/Y Pads	Multitouch X/Y Pads	Leds & Meters
CC	√ (*)	√ (*)	√	√
CC Coarse/ Fine	√ (*)	√ (*)	√	√
RPN/NRPN	√ (*)	√ (*)	√	√
Channel Pressure	√ (*)	√ (*)	√	√
Pitch Bend	√ (*)	√ (*)	√	√
Program Change	√ (*)	√ (*)	√	√
Song Select	√ (*)	√ (*)	√	√
System Message	-	-	-	-
SysEx	√ (*)	√ (*)	√	√
Note On/ Note Off	-	-	-	-
Value Note	-	-	-	-

(*) Can be bidirectional

	Ribbons	Labels	Jog Wheels	Pick Lists
CC	√	-	√	√ (*)
CC Coarse/ Fine	√	-	-	√ (*)
RPN/NRPN	√	-	-	√ (*)
Channel Pressure	√	-	-	√ (*)
Pitch Bend	√	-	-	√ (*)
Program Change	√	-	-	√ (*)
Song Select	√	-	-	√ (*)
System Message	-	-	-	-
SysEx	√	√	-	√ (*)
Note On/ Note Off	-	-	-	-
Value Note	-	-	-	-

(*) Can be bidirectional

Control Touch MIDI Messages

	Sliders, Knobs and Faders	Drum Pads & Piano Keys	X/Y Pads	Multitouch X/Y Pads	Ribbons
CC	√	√	√	√	√
CC Coarse/Fine	√	√	√	√	√
RPN/NRPN	√	√	√	√	√
Channel Pressure	√	√	√	√	√
Pitch Bend	√	√	√	√	√
Program Change	√	√	√	√	√
Song Select	√	√	√	√	√
System Message	√	√	√	√	√
SysEx	√	√	√	√	√
Note On/Note Off	√	√	√	√	√
Value Note	√	-	√	√	√

Control X/Y Tracking MIDI Messages

	Drum Pads	Piano Keys (Y Tracking only)	Piano Keyboards (Y Tracking only)
CC	√	√	√
CC Coarse/Fine	√	√	√
RPN/NRPN	√	√	√
Channel Pressure	√	√	√
Pitch Bend	√	√	√
Program Change	√	√	√
Song Select	√	√	√
System Message	-	-	-
SysEx	√	√	√
Note On/Note Off	-	-	-
Value Note	-	-	-

Control Aftertouch MIDI Messages

	Drum Pads	Piano Keys	Piano Keyboards
CC	√	√	√
CC Coarse/Fine	√	√	√
RPN/NRPN	√	√	√
Channel Pressure	√	√	√
Pitch Bend	√	√	√
Program Change	-	-	-
Song Select	-	-	-
System Message	-	-	-
SysEx	√	√	√
Note On/Note Off	-	-	-
Value Note	-	-	-

OSC Messages

OSC Messages

Parameters	
Mode (*)	Send and Receive, Send Only, Receive Only
Address	OSC address
Argument Type	Integer ⁞ Float
Filter Same Value	Off, On
Minimum / Off Value	
Maximum / On Value	

(*) Value OSC Message only

OSC Messages for Jog Wheel Controls

Parameters	
Address	OSC address
Argument Type	Integer ⁞ Float
Filter Same Value	Off, On
Left Rotation Value	
Right Rotation Value	

OSC X/Y Messages

Parameters	
Address	OSC address
X Argument Type	Integer ⁞ Float
Y Argument Type	Integer ⁞ Float
Filter Same Value	Off, On
X Minimum Value	
X Maximum Value	
Y Minimum Value	
Y Maximum Value	

OSC Split X/Y Messages

Parameters	
X Address	OSC address
Y Address	OSC address
X Argument Type	Integer ⁞ Float
Y Argument Type	Integer ⁞ Float
Filter Same Value	Off, On
X Minimum Value	
X Maximum Value	
Y Minimum Value	
Y Maximum Value	

OSC String Message

Parameters	
Address	OSC address

Available OSC Messages per Control Type

Control Value OSC Messages

	Sliders, Knobs and Faders	X/Y Pads	Multitouch X/Y Pads	Leds and Meters
OSC Message	√ (*)	-	-	√
OSC X/Y Message	-	√ (*)	√	-
OSC Split Message	-	√ (*)	√	-
OSC String Message	-	-	-	-

(*) Can be bidirectional

	Ribbons	Labels	Jog Wheels	Pick Lists
OSC Message	√	-	√	√ (*)
OSC X/Y Message	-	-	-	-
OSC Split Message	-	-	-	-
OSC String Message	-	√	-	-

(*) Can be bidirectional

Control Touch OSC Messages

	Sliders, Knobs and Faders	Drum Pads	X/Y Pads	Multitouch X/Y Pads	Ribbons
OSC Message	√	√	√	√	√
OSC X/Y Message	-	-	-	-	-
OSC Split Message	-	-	-	-	-

Control X/Y Tracking OSC Messages

	Drum Pads	Piano Keys (Y Tracking only)	Piano Keyboards (Y Tracking only)
OSC Message	√	√	√
OSC X/Y Message	-	-	-
OSC Split Message	-	-	-

Control Aftertouch OSC Messages

	Drum Pads	Piano Keys	Piano Keyboards
OSC Message	√	√	√
OSC X/Y Message	-	-	-
OSC Split Message	-	-	-

Variable Messages

Variable Set Messages

Parameters	
Variable Name	
Mode (*)	Send and Receive, Send Only, Receive Only
Minimum / Off Value	Depends on variable's range
Maximum / On Value	Depends on variable's range

(*) Compatible controls only

Variable Add Messages

Parameters	
Variable Name	
Rounding Mode	Clipped | Circular
Value	[-127 ; 127]

Variable Binders

Parameters	
Variable Name	

Internal Methods

Parameters	
Method Name (*)	Method

(*) Available Methods :

- Pages Manager : Go To Left Page
- Pages Manager : Go To Right Page
- Pages Manager : Go To Up Page
- Pages Manager : Go To Down Page
- Page : Restore Default Values
- Page : Set Current Values To Default Values
- Page : Send SysEx Request
- Page : Send All Current Values
- Page : Randomize All Current Values

Available Variable Messages per Control Type

	Sliders, Knobs and Faders	X/Y Pads	Multitouch X/Y Pads	Drum Pads	Leds & Meters
Variable Set Message	√ (*)	√ (*)	√	√ (*)	-
Variable Add Message	-	-	-	√	-
Variable Binder	-	-	-	-	√
Internal Method	-	-	-	√	-

(*) Can be bidirectional

	Ribbons	Labels	Jog Wheels	Pick Lists
Variable Set Message	√	-	-	√ (*)
Variable Add Message	-	-	√	-
Variable Binder	-	√	-	-
Internal Method	-	-	-	-

(*) Can be bidirectional

Provided Ready-To-Go Pages

TB MIDI Stuff provides natively ready-to-go editors for these synthesizers :

- Arturia Mini V
- Korg microKORG

As these editors are standard pages, you can edit and modify them to fit your needs.

NOTE : TB Stuff is a really small company and can't provide «Ready-To-Go» pages for all devices and softwares you may use with TB MIDI Stuff. We will try to enhance this section in future.

Arturia Mini V Editor

Arturia Mini V Editor was designed by Pyer © 2013 for TBStuff

(http://www.pierrecollard.com)

Korg microKORG Editor

Korg microKORG Editor is a Canvas Snapshot with two pages : one for SYNTH patches, one for VOCODER patches. These pages let you to drive any parameters that the microKORG expose with CC and NRPN MIDI messages.

NOTE : This editor use the factory CC assignations (i.e. if you have changed microKORG CC assignations, you need to modify the messages sent by these pages regarding to what CCs you choose).

Arpeggiator Settings

In both pages, you can show the arpeggiator settings with tap on «GFG» button. It will show a popup window to set arpeggiator's Type, Range, Latch and Gate parameters.

Advanced Behaviors

This section is not exhaustive one. Its goal is to give you some ideas to build advanced pages.

Dynamic Controls Showing

All controls have a «Hidden» entry and a «Hidden Condition» entry in Control Settings. The first one lets you hide a control permanently. The second one lets you to show/hide a control regarding to a condition on a variable's value (you can use a global variable, a page variable, an user page variable or a control variable).

Hidden Conditions allows you to build some dynamic pages, like popup windows, conditional controls showing, etc.

As example, you can open the provided «Korg microKORG» canvas snapshot to see hidden condition in action :

• The «About» window use an user page variable, called «About», to do a popup feature

• The «CFG» button on «ARP» section also use an user page variable, called «ARP CONFIG», to show a popup

• «OSC 1 Control 1 Label», «OSC 1 Control 1», «OSC 1 Control 2» (slider) «OSC 1 Control 2» (pick list) use a hidden condition on «OSC 1 WAVE» value to dynamically adapt the content to the selected waveform (DWGS entry shows a second pick list).

You can also see the «Keyboard Popup Tutorial» on the TBMS Cookbook (http://www.tbstuff.com/?page_id=982), which use a variable to popup a basic piano keyboard (you can use this page as a starting point to build a page with a popup keyboard).

Increment/Decrement Buttons

Sometimes, it can be very useful to set MIDI/OSC messages to a user variable rather than to a control, particularly if you want to access to a parameter with more than a single control. As example, you may need to add increment/decrement buttons to a slider or a pick list.

The provided page «Other/Program Change Demo» use this principle to send a MIDI program change message with four controls : a pick list, a jog wheel and two drum pads (increment and decrement button). All these controls send messages to an internal user variable called «Program Change». This variable send the real program change MIDI message.

Radio Groups

Page Design Advice

Design a page with TB MIDI Stuff is the same thing that design a Graphical User Interface (GUI). Build a good GUI is a kind of art and is not as easy as you may think. The result is a compromise of some constraints. We have some experience in user interface design, so we give you some tips to simplify your work.

When you design a TBMS page, you may answer to questions like «What will be the main usage of my page (Studio, Live Performance, etc.) ?», «What are the most important controls ?» or «What is the best control kind for a specific feature ?».

With synthesizer editors, another question can be «What are controls that I need a quick access ?», «What are controls which can be on a popup window ?» or «How many pages I need (single page or canvas snapshot) ?»

Build a good TB MIDI Stuff page takes times and can be painful. You can easily reduce the spent time by using some techniques. We list here some of them.

• A good method is to draw your page on a piece of paper before to start to build it with TBMS. Like an architect, you may need to have plans of your future TBMS page. This method allows you to see what you want to do and where you want to go.

• List all features that your page will provide : this avoids forgetting some and it speeds up the page editing.

• Name your controls with well thought names : «VCO 1 Frequency» is a more clever name than «Slider 47» (this will speed up the later page edits).

• The use of colors can facilitate the use of your page. As example, all parameters for a specific VCO can share the same color. **But be careful, using too much different colors can add more visual complexity.**

• Ensure a visual coherence to simplify your brain work when you use your page. As example, align all controls in the same way.

• If you plan to share your page with other people, keep in mind how they can use your page.

• Prefer a more readable font for text labels than another more artistic one.

• Try to use custom tooltips to reflect what your device/software will show.

Appendices

Maths behind the scene

Controls interpolation

Internally, all controls and variables use a real normalized value in range [0 ; 1]. This internal representation has the advantage that it can be easily converted into any range of values without the dependency of any particular message range.

This value is converted with a linear interpolation, regarding to the message range. The formula is :

Let x, the internal control's value

Let v, the message sent value

v = minvalue + (maxvalue - minvalue) * x

NOTE : With MIDI messages, the final value is converted to the nearest integer (i.e. INT (x + 0.5))

With the previous function, TBMS can reverse it to do bi direction. Here, the formula :

Let v, the received value in message range (i.e. [0 ; 127] for a Control Change message, etc.)

Let x, the converted control's value

x = (v - minvalue) / (maxvalue - minvalue)

Note : MIN and MAX operator are used to clip the calculated value to the range [0; 1] (i.e. MAX (0 ; MIN (1 ; x)))

Signed Values

In computer science, we generally use two's complement method to represent signed values. People can see it as something like «dark side of the Force». In fact, it is more simple than that.

Take a 7bits value. With a linear representation, the value range is [0; 127] (maximum is 2^7 - 1). With signed representation, the value range is [-64; 63] (the most significant bit is used to represent the sign of the value).

If you see a signed value with a linear way, you will see that -64 is represented by 65 and -1 by 127. Very strange...

A quick way to convert a signed value to an unsigned value with two's complement method is to calculate :

Let val, the value you want to convert in range [-64; 63]

MOD (128 + val; 128)

This formula works only with 7bits values. A more generic formula is :

Let n, the bits count

Let val, the value you want to convert in range [-2^(n - 1); 2^(n - 1) - 1]

MOD (2^n + val; 2^n)